

### Clean Copy of Amended Claims

39. (Amended) A method of controlling the porosity and pore size distribution of aluminum oxide based ceramic bodies comprising
- reacting boehmite with a carboxylic acid to produce carboxylate-alumoxane nanoparticles,
  - drying the carboxylate-alumoxane nano-particles,
  - re-dissolving the carboxylate-alumoxane nanoparticles in a solvent,
  - evaporating the solvent so as to deposit the nanoparticles on a substrate,
  - firing the deposited nanoparticles at a temperature greater than 300 °C so as to form an aluminum oxide based ceramic body.
40. The method of claim 39 wherein the boehmite is pseudo-boehmite.
41. The method of claim 39 wherein the ceramic body comprises the thermolysis product of a carboxylate-alumoxane represented by the formula  $[Al(O)_x(OH)_y(O_2CR)_z]_n$ , wherein x is from 0 to 1.5, y is from 0 to 3, z is from 0 to 3, n is greater than 6, and R is hydrogen or an organic group.
42. The method of claim 41 wherein each R, which may be the same or different, is hydrogen or an organic group selected from the group consisting of alkyl, alkenyl, aromatic, haloalkyl, haloalkenyl, and haloaromatic groups or alkyl, alkenyl, and aromatic ether groups or an organic group containing a hetero-atom including, oxygen, nitrogen, sulfur, phosphorous.
43. The method of claim 41 wherein the carboxylate is derived from a carboxylic acid selected from the group consisting of acetic acid, methoxyacetic acid, methoxyethoxyacetic acid, and methoxyethoxyethoxyacetic acid.
44. (Amended) The method of claim 43 wherein the carboxylate-alumoxane is the reaction product of a carboxylic acid and boehmite.
45. (Amended) The method of claim 43 wherein the carboxylate-alumoxane is the reaction product of a carboxylic acid and pseudo-boehmite.

46. (Amended) The method of claim 43 wherein the carboxylate-alumoxane is the reaction product of two or more carboxylic acids and boehmite.
47. (Amended) The method of claim 46 wherein the carboxylate-alumoxane is the reaction product of the sequential reaction of two or more carboxylic acids with boehmite.
48. (Amended) The method of claim 46 wherein the carboxylate-alumoxane is the reaction product of the parallel reaction of two or more carboxylic acids with boehmite.
49. (Amended) The method of claim 46 wherein the carboxylate-alumoxane is the reaction product of the sequential reaction of a first carboxylic acid with boehmite to make a product, followed by the reaction of said product with a second carboxylic acid.
50. (Amended) The method of claim 46 wherein the carboxylate-alumoxane is the reaction product of two or more carboxylic acids and pseudo-boehmite.
51. (Amended) The method of claim 49 wherein the carboxylate-alumoxane is the reaction product of the sequential reaction of a first carboxylic acid with pseudo-boehmite to make a product, followed by the reaction of said product with a second carboxylic acid.
52. (Amended) The method of claim 39, further comprising introducing the dissolved carboxylate-alumoxane nanoparticles to a ceramic support.
53. (Amended) The method of claim 52 wherein deposition of the nanoparticles takes place on the support.
54. The method of claim 53 wherein the support comprises a mold.
55. The method of claim 54 wherein the mold comprises a porous material.
56. The method of claim 55 wherein the porous material comprises a filter.

57. The method of claim 56 wherein the filter comprises a frit.
58. The method of claim 39 wherein the solvent comprises water.
59. The method of claim 39 wherein the ceramic body comprises a membrane.
61. (Amended) The method of claim 39 further comprising infiltrating the dissolved carboxylate-alumoxane nanoparticles to a ceramic support
62. The method of claim 39 further comprising mixing two or more carboxylic acids prior to reacting boehmite with a carboxylic acid to produce carboxylate-alumoxane nanoparticles.
63. The method of claim 39 further comprising reacting boehmite sequentially with two or more carboxylic acids.
64. (Amended) The method of claim 39 further comprising dip-coating a fiber in the solution of re-dissolved carboxylate-alumoxane nano-particles and solvent, wherein the fiber is the substrate on which the nanoparticles are deposited in the evaporating step.
73. (Amended) The method of claim 39 wherein the dried nanoparticles are fired slowly at a temperature sufficient to burn off organic constituents.
74. (Amended) The method of claim 39 wherein the dried nanoparticles are fired at a temperature between 25 °C and 225 °C.
75. (Amended) The method of claim 74 further comprising holding the nanoparticles at a temperature of 225 °C for 30 minutes.
76. (Amended) The method of claim 74 wherein the nanoparticles are fired at a temperature that is ramped from 25 °C to 225 °C at a rate of 1 °C per minute.

77. (Amended) The method of claim 76 further comprising holding the nanoparticles at a temperature of 225 °C for 30 minutes.

78. (Amended) The method of claim 39 further comprising holding the nanoparticles at a temperature of 300 °C for 80 minutes.

79. (Amended) The method of claim 39 further comprising firing the nanoparticles by ramping the temperature to 1100 °C at a rate of 2 °C per minute.

80. (Amended) The method of claim 79 further comprising holding the nanoparticles at a temperature of 1100 °C for 400 minutes.

81. (Amended) The method of claim 79 further comprising cooling the nanoparticles slowly to room temperature.